

## MEASUREMENT AND GEOMETRY

The following ten California mathematics academic content standards from the Measurement and Geometry strand are assessed on the CAHSEE by 17 test questions and are represented in this booklet by 35 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 7 — MEASUREMENT AND GEOMETRY	
<b>Standard Set 1.0</b>	<b>Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems:</b>
1.1	Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).
1.2	Construct and read drawings and models made to scale.
1.3	Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.
<b>Standard Set 2.0</b>	<b>Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area and volume are affected by changes of scale:</b>
2.1	Use formulas routinely for finding the perimeter and area of basic two-dimensional figures and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders.
2.2	Estimate and compute the area of more complex or irregular two- and three-dimensional figures by breaking the figures down into more basic geometric objects.
2.3	Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and volume is multiplied by the cube of the scale factor.
2.4	Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches or $[1 \text{ ft}^2] = [144 \text{ in}^2]$ , 1 cubic inch is approximately 16.38 cubic centimeters or $[1 \text{ in}^3] = [16.38 \text{ cm}^3]$ ).

*Measurement and Geometry*

**Standard Set 3.0** Students know the Pythagorean theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures:

- |     |  |
|-----|--|
| 3.2 | Understand and use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their image under translations and reflections.  |
| 3.3 | Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement. |
| 3.4 | Demonstrate an understanding of conditions that indicate two geometrical figures are congruent and what congruence means about the relationships between the sides and angles of the two figures.  |

83. One millimeter is—

- A  $\frac{1}{1000}$  of a meter.
- B  $\frac{1}{100}$  of a meter.
- C 100 meters.
- D 1000 meters.

M00276

84. A boy is two meters tall. About how tall is the boy in feet (ft) and inches (in.)?  
(1 meter  $\approx$  39 inches.)

- A 5 ft 0 in.
- B 5 ft 6 in.
- C 6 ft 0 in.
- D 6 ft 6 in.

M02044

*Measurement and Geometry*

85. Juanita exercised for one hour. How many seconds did Juanita exercise?

A 60  
B 120  
C 360  
D 3,600

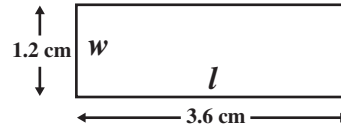
M03074

86. If Jill is driving at 65 miles per hour, what is her approximate speed in kilometers per hour? (1 mile  $\approx$  1.6 kilometers)

A 16  
B 41  
C 104  
D 173

M13251

87. The actual width ( $w$ ) of a rectangle is 18 centimeters (cm). Use the scale drawing of the rectangle to find the actual length ( $l$ ).

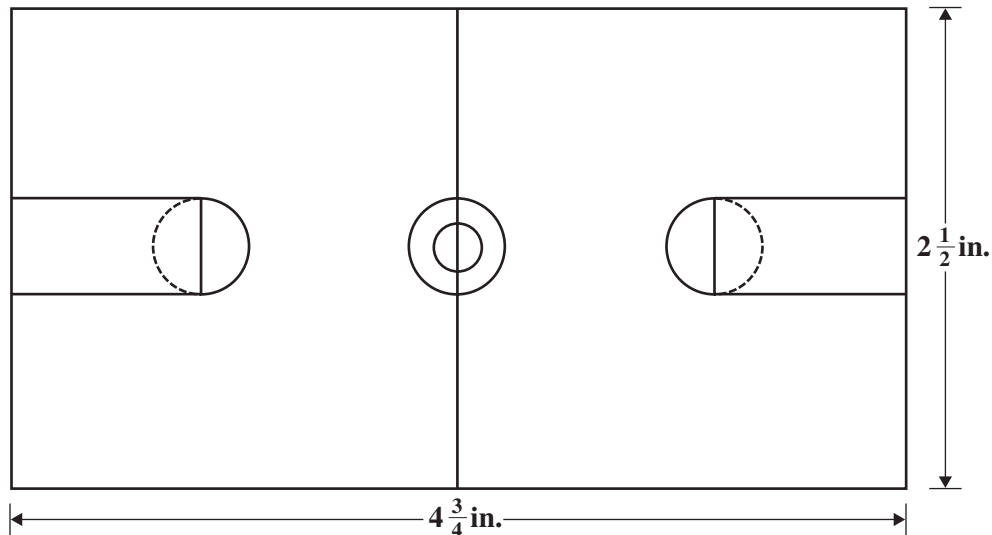


A 6 cm  
B 24 cm  
C 36 cm  
D 54 cm

M02087

*Measurement and Geometry*

88. The scale drawing of the basketball court shown below is drawn using a scale of 1 inch (in.) = 24 feet (ft).



What is the length, in feet, of the basketball court?

- A 90 ft
- B 104 ft
- C 114 ft
- D 120 ft

M02233

*Measurement and Geometry*

89. Sixty miles per hour is the same rate as which of the following?

A 1 mile per minute  
B 1 mile per second  
C 6 miles per minute  
D 360 miles per second

M02473

90. Beverly ran six miles at the speed of four miles per hour. How long did it take her to run that distance?

A  $\frac{2}{3}$  hr  
B  $1\frac{1}{2}$  hrs  
C 4 hrs  
D 6 hrs

M02041

91. Marcus can type about 42 words per minute. If he types at this rate for 30 minutes without stopping, about how many words will he type?

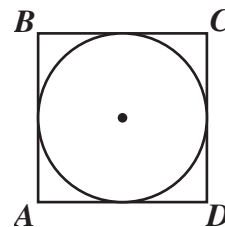
A 1260  
B 2100  
C 2520  
D 4200

M21029

92. A landscaper estimates that landscaping a new park will take 1 person 48 hours. If 4 people work on the job and they each work 6-hour days, how many days are needed to complete the job?

A 2  
B 4  
C 6  
D 8

M11541

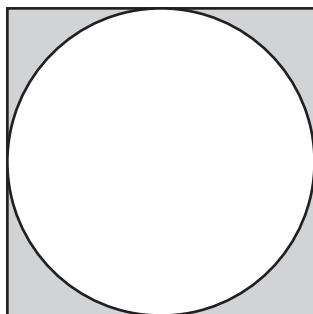


93. In the figure above, the radius of the inscribed circle is 6 inches (in.). What is the perimeter of square  $ABCD$ ?

A  $12\pi$  in.  
B  $36\pi$  in.  
C 24 in.  
D 48 in.

M02236

*Measurement and Geometry*



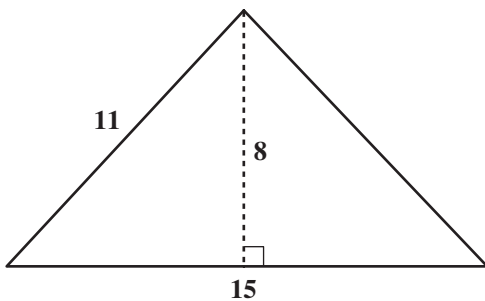
10 feet

94. The largest possible circle is to be cut from a 10-foot square board. What will be the approximate area, in square feet, of the remaining board (shaded region)?

( $A = \pi r^2$  and  $\pi \approx 3.14$ )

- A 20
- B 30
- C 50
- D 80

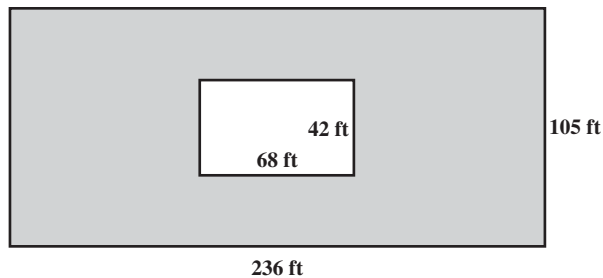
M00404



95. What is the area of the triangle shown above?

- A 44 square units
- B 60 square units
- C 88 square units
- D 120 square units

M00101



96. A rectangular pool 42 feet by 68 feet is on a rectangular lot 105 feet by 236 feet. The rest of the lot is grass. Approximately how many square feet is grass?

- A 2,100
- B 2,800
- C 21,000
- D 28,000

M00311



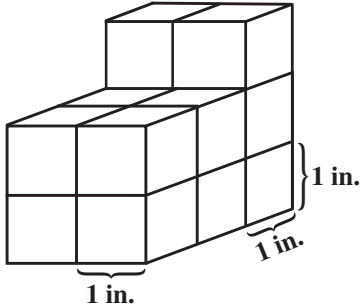
97. What is the volume of the shoebox shown above in cubic inches ( $\text{in.}^3$ )?

- A 29
- B 75
- C 510
- D 675

M02629

*Measurement and Geometry*

98. One-inch cubes are stacked as shown in the drawing below.

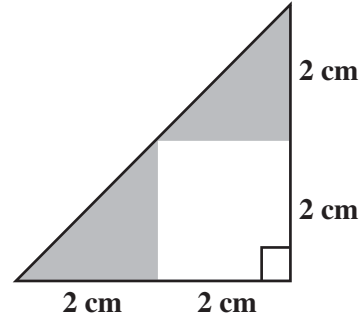


What is the total surface area?

- A 19 in.<sup>2</sup>
- B 29 in.<sup>2</sup>
- C 32 in.<sup>2</sup>
- D 38 in.<sup>2</sup>

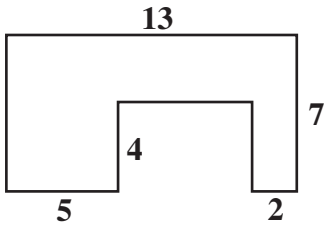
M02812

100. What is the area of the shaded region in the figure shown below?



- A 4 cm<sup>2</sup>
- B 6 cm<sup>2</sup>
- C 8 cm<sup>2</sup>
- D 16 cm<sup>2</sup>

M02814

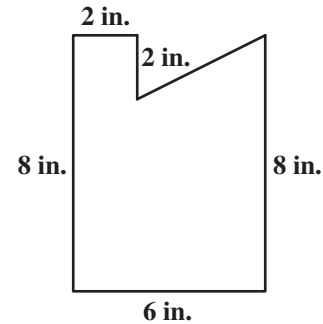


99. In the figure shown above, all the corners form right angles. What is the area of the figure in square units?

- A 67
- B 73
- C 78
- D 91

M00318

101. A right triangle is removed from a rectangle as shown in the figure below. Find the area of the remaining part of the rectangle.

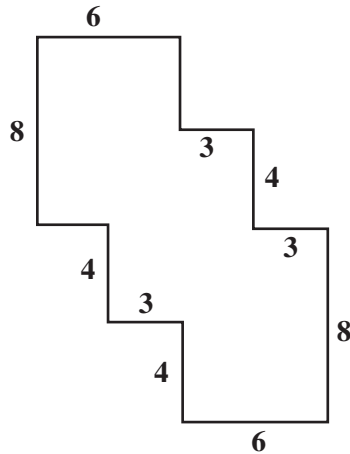


- A 40 in.<sup>2</sup>
- B 44 in.<sup>2</sup>
- C 48 in.<sup>2</sup>
- D 52 in.<sup>2</sup>

M02093

*Measurement and Geometry*

102. In the figure below, every angle is a right angle.

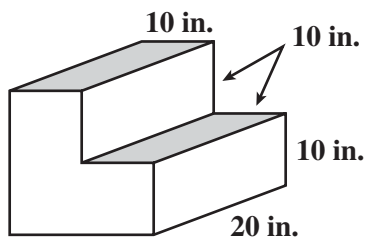


What is the area, in square units, of the figure?

- A 96
- B 108
- C 120
- D 144

M10790

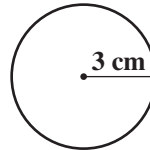
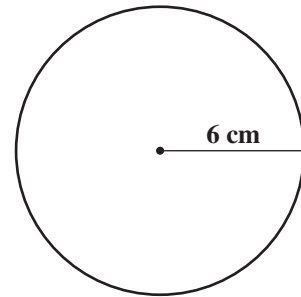
103. The short stairway shown below is made of solid concrete. The height and width of each step is 10 inches (in.). The length is 20 inches.



What is the volume, in cubic inches, of the concrete used to create this stairway?

- A 3000
- B 4000
- C 6000
- D 8000

M02990

Circle  $x$ Circle  $y$ 

104. The two circles shown above have radii of 3 cm and 6 cm.

What is  $\frac{\text{Circumference of Circle } x}{\text{Circumference of Circle } y}$ ?

- A  $\frac{1}{4}$
- B  $\frac{1}{2}$
- C  $\frac{\pi}{4}$
- D  $\frac{\pi}{2}$

M02217

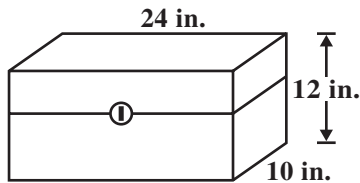
*Measurement and Geometry*

105. Bonni has two similar rectangular boxes. The dimensions of box 1 are twice those of box 2. How many times greater is the volume of box 1 than the volume of box 2?

A 3  
B 6  
C 8  
D 9

M21061

106. Gina is painting the rectangular tool chest shown in the diagram below.

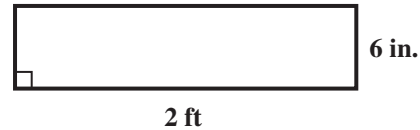


If Gina paints only the outside of the tool chest, what is the total surface area, in square inches ( $\text{in.}^2$ ), she will paint?

A 368  
B 648  
C 1296  
D 2880

M20643

107. The width of the rectangle shown below is 6 inches (in.). The length is 2 feet (ft).



What is the area of the rectangle in square inches?

A 12  
B 16  
C 60  
D 144

M03243

108. One cubic inch is approximately equal to 16.38 cubic centimeters. Approximately how many cubic centimeters are there in 3 cubic inches?

A 5.46  
B 13.38  
C 19.38  
D 49.14

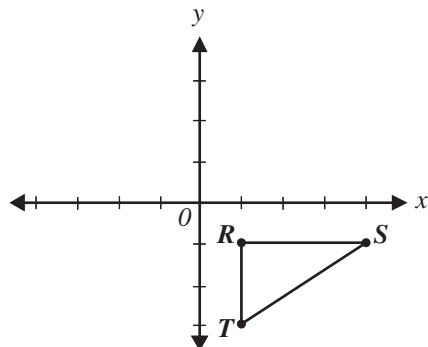
M02700

109. A rectangular field is 363 feet long and 240 feet wide. How many acres is the field? (1 acre = 43,560 square feet)

A 2  
B 3  
C 4  
D 5

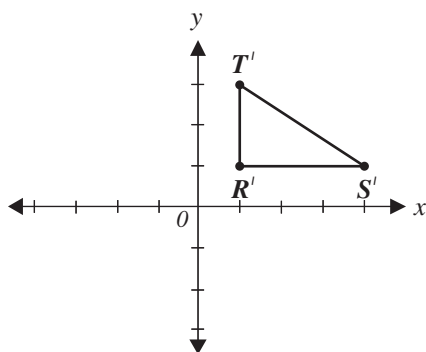
M13918

*Measurement and Geometry*

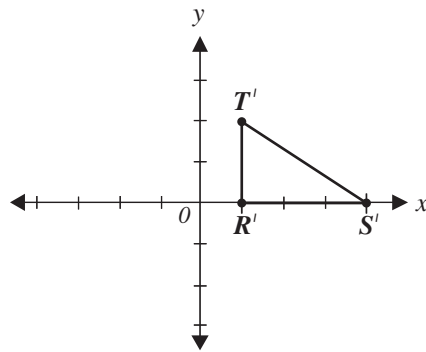


110. Which of the following triangles  $R'S'T'$  is the image of triangle  $RST$  that results from reflecting triangle  $RST$  across the  $y$ -axis?

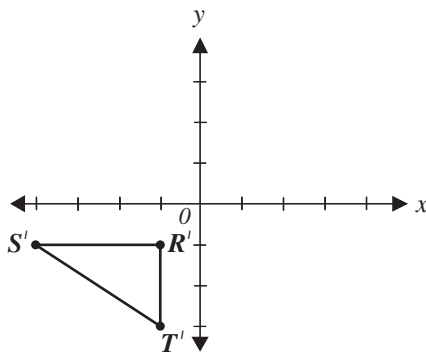
A



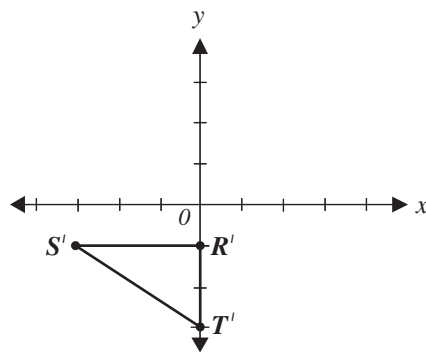
C



B



D



M02861

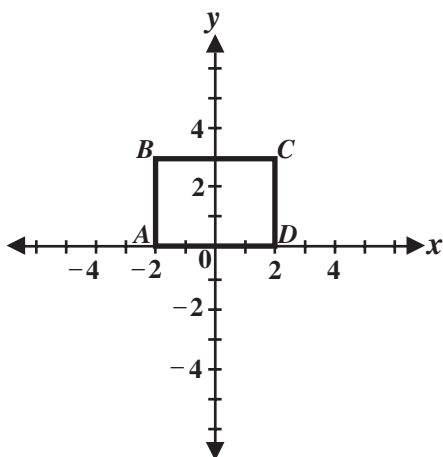
## Measurement and Geometry

111. The points (1, 1), (2, 3), (4, 3), and (5, 1) are the vertices of a polygon. What type of polygon is formed by these points?

- A Triangle
- B Trapezoid
- C Parallelogram
- D Pentagon

M02718

112. The graph of rectangle  $ABCD$  is shown below.

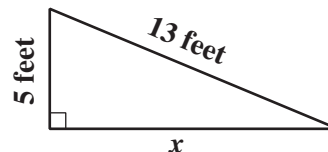


What is the area, in square units, of rectangle  $ABCD$ ?

- A 6
- B 10
- C 12
- D 14

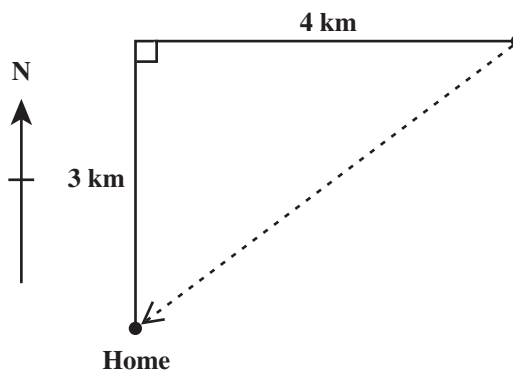
M03136

113. What is the value of  $x$  in the right triangle shown below?



- A 8 feet
- B 12 feet
- C 18 feet
- D 23 feet

M03181

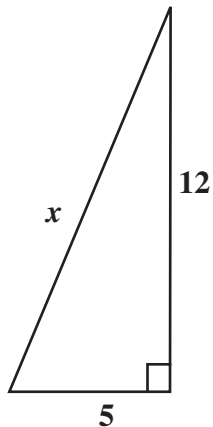


114. The club members hiked 3 kilometers north and 4 kilometers east, but then went directly home as shown by the dotted line. How far did they travel to get home?

- A 4 km
- B 5 km
- C 6 km
- D 7 km

M00120

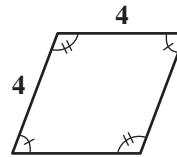
*Measurement and Geometry*



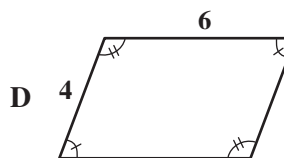
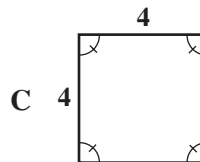
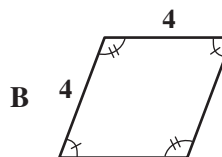
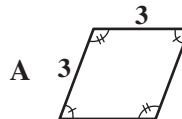
115. What is the value of  $x$  in the triangle shown above?

- A 11
- B 13
- C 17
- D 169

M02446



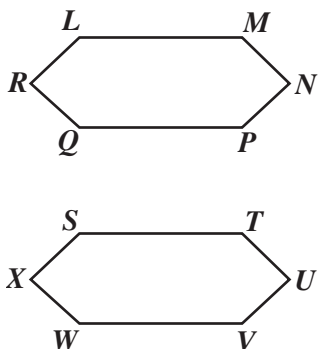
116. Which figure is congruent to the figure shown above?



M00020

*Measurement and Geometry*

117. In the diagram below, hexagon  $LMNPQR$  is congruent to hexagon  $STUVWX$ .



Which side is the same length as  $\overline{MN}$ ?

- A  $NP$
- B  $TU$
- C  $UV$
- D  $WX$

M13069

*Measurement and Geometry*

Question Number	Correct Answer	Standard	School Year of Exam
83	A	7MG1.1	2002-2003
84	D	7MG1.1	2001-2002
85	D	7MG1.1	2001-2002
86	C	7MG1.1	2004-2005
87	D	7MG1.2	2001-2002
88	C	7MG1.2	2000-2001
89	A	7MG1.3	2001-2002
90	B	7MG1.3	2001-2002
91	A	7MG1.3	2003-2004
92	A	7MG1.3	2004-2005
93	D	7MG2.1	2001-2002
94	A	7MG2.1	2000-2001
95	B	7MG2.1	2000-2001
96	C	7MG2.1	2000-2001
97	D	7MG2.1	2000-2001
98	D	7MG2.2	2001-2002
99	A	7MG2.2	2001-2002
100	A	7MG2.2	2000-2001
101	B	7MG2.2	2000-2001
102	C	7MG2.2	2004-2005
103	C	7MG2.3	2002-2003
104	B	7MG2.3	2000-2001
105	C	7MG2.3	2003-2004
106	C	7MG2.3	2004-2005
107	D	7MG2.4	2002-2003
108	D	7MG2.4	2000-2001
109	A	7MG2.4	2004-2005
110	B	7MG3.2	2000-2001
111	B	7MG3.2	2000-2001
112	C	7MG3.2	2003-2004
113	B	7MG3.3	2002-2003
114	B	7MG3.3	2001-2002
115	B	7MG3.3	2000-2001
116	B	7MG3.4	2001-2002
117	B	7MG3.4	2003-2004